

PATENT CLAIMS

1. A drawworks for lowering and withdrawing a load, in particular a drilling device, having a flexible traction element (4, 104) which is fastened to the load, having a drum (5, 105), mounted so as to be rotatable about a rotation axis (S), for winding up the traction element (4), and having at least one rotary drive device (19, 119) which comprises at least one rotary drive motor (21, 22, 121, 122) which acts on the drum (5, 105) via a summation gear (20, 120) and with which the drum (5, 105) can be rotationally driven optionally in the lowering or withdrawing direction of the traction element (4, 104), characterized in that the summation gear (20, 120) is designed as a multi-speed gear.
2. The drawworks as claimed in claim 1, characterized in that the rotary drive device (19, 119) comprises at least two rotary drive motors (21, 22; 121, 122).
3. The drawworks as claimed in claim 2, characterized in that the rotary drive device (19), relative to the rotation axis (S) of the drum (5), is arranged next to the drum (5) in such a way that the drum (5) and the rotary drive device (19), in a projection perpendicular to the rotation axis (S) of the drum (5), at least partly overlap.
4. The drawworks as claimed in claim 3, characterized in that the drive shafts of the rotary drive motors (21, 22) are arranged so as to lie on a common straight line.
5. The drawworks as claimed in claim 2, characterized in that the at least two rotary drive motors (121, 122) are arranged next to one another in extension of the rotation axis (S) of the drum (105).

6. The drawworks as claimed in claims 1 to 5, characterized in that the drum (5, 105) is connected in a rotationally fixed manner to a rotatably mounted drum
5 shaft (6).

7. The drawworks as claimed in claim 6, characterized in that the drum shaft (5, 105) is connected to the output side (16, 116) of the summation gear (20, 120),
10 the input side (29, 129) of which is coupled to the output shafts (27, 28; 127, 128) of the rotary drive motors (21, 22; 121, 122).

8. The drawworks as claimed in one of claims 1 to 7,
15 characterized in that the summation gear (20, 120) is a mechanically acting two-speed gearbox.

9. The drawworks as claimed in one of claims 6 to 8, characterized in that the drum shaft (6) is coupled at
20 one end to a mechanically acting brake device and at the other end to an electromagnetically acting brake device.

10. The drawworks as claimed in claim 9, characterized in that the mechanically acting brake device is a disk
25 brake arrangement (13) or a disk or multiple-disk brake, and the electrically acting brake device is an eddy-current brake.

30 11. The drawworks as claimed in one of claims 1 to 10, characterized in that the at least one rotary drive motor (21, 22; 121, 122) is a direct-current electric motor.

35 12. The drawworks as claimed in one of claims 1 to 10, characterized in that the at least one rotary drive motor (21, 22; 121, 122) is an alternating-current electric motor.

13. The drawworks as claimed in one of claims 1 to 9,
characterized in that the at least one rotary drive
motor (21, 22; 121, 122) is a hydraulic motor.

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14. The drawworks as claimed in one of claims 1 to 13,
characterized in that the summation gear (20, 120) is
equipped with a safety device which, if a maximum
admissible torque at the input shaft is exceeded,
10 switches over the gearbox automatically into the gear
of the highest ratio of the speed of the input shaft to
the speed of the output shaft.